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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

AUG 30 2012

Mr. Jamie Staley
U.S. Registration Manager
Pioneer Hi-Bred International, Inc.
7100 N.W. 62nd Avenue
P.O. Box 1000
Johnston, IA 50131-1000

SUBJECT: April 13, 2012 Request to Amend the Expiration Date for Optimum® Acremax® XTRA Insect Protection
EPA Reg. No.: 29964-11

Dear Mr. Staley:

The amendment referred to above, submitted in connection with registration under Section 3(c)(7)(A) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, is acceptable subject to the following comments.

1) The subject registration will automatically expire on midnight September 30, 2014.

2) In order to improve the strength of modeling, you must address and incorporate the following uncertainties (as described in the 2/15/2012 J. Martinez insect resistance management review for Optimum® AcreMax® XTreme) into a new CEW model by April 1, 2013:

Corn Earworm (CEW) Modeling

CEW can have up to six generations per year in the southern U.S. and may be at greater risk for resistance in a seed blend environment. Submit CEW modeling for product durability that addresses the following concerns:

CEW will encounter a mosaic of *Bt* expression in kernels of refuge corn ear as well as in *Bt* corn ear. Seed blends containing *Bt* and non-*Bt* seeds may actually accelerate resistance in ear feeding Lepidoptera including corn earworm and fall armyworm. *Bt* ingestion has shown to promote wandering in larvae, and individuals that receive a sub-lethal dose may move to another kernel. Horner et al. 2003 evaluated feeding patterns of CEW in MON810 and non-*Bt* maize and determined that larvae had greater movement on *Bt* ears and essentially sampled kernels at greater frequency, than their counterparts who fed exclusively and in a more compact fashion on non-*Bt* corn ears. This ability to move to another source of kernel in this mosaic of toxins (lethal vs. sublethal) and non-toxin environment will give heterozygous individuals a great fitness

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advantage; the functional dominance of the resistance allele will increase. (Porter 2011, personal communication).

Horner and Dively (2003) found that CEW exposed to Cry1Ab had reduced cannibalistic behavior which, they hypothesize, could serve as a mechanism to increase the selective differential between susceptible and resistant CEW and essentially lead to greater resistance evolution. (Cannibalistic behavior results " in partially resistant larvae feeding on nontoxic food [their fellow intoxicated larvae], thus temporarily providing escape from exposure to the *Bt* endotoxin.")

CEW development on Bt corn is delayed (Sims et al. 1996, Storer et al. 2001). This could enable a fraction of adult CEW to mate with CEW emerging from *Bt* cotton. Discretely breeding populations could become continuously breeding for part of the year in this scenario. This may be an important aspect to incorporate into IRM models of the south where corn and cotton are host plants of the same pest. Theoretical explorations are needed to assess effects of this delayed development on corn on the resistance evolution in CEW.

3) The corn rootworm portion of Condition 8.e) Remedial Action Plan for Corn Rootworm and OAM Xtra Corn is modified as follows.

e) Remedial Action Plan for Corn Rootworm and OAM Xtra Corn

The remedial action plan is designed as a tiered approach for mitigating western and northern corn rootworm resistance development specifically due to the commercialization of OAM Xtra corn. The following program summary describes, in order of events, the steps that must be taken to implement a remedial action plan if resistance to target pests is confirmed.

1. Suspected Resistance from Population Monitoring

Resistance will be suspected if investigations of target pest injury potential to OAM Xtra maize from the Sublethal Seedling Assay show that:

- Injury potential of a target pest population obtained as part of the annual insect monitoring program has increased to a level representative of product failure in field conditions;
- The seeds used in the investigation of this population's injury potential contain Cry34/Cry35Ab1 at levels representative of (and in the same genetic background as) the benchmark study; and
- The change in injury potential has been documented as a heritable characteristic of the target pest population and not a result of experimental error.

If resistance is "suspected" Pioneer will inform growers in the area of the potential benefit of augmenting CRW control such as adulticide treatment and/or crop rotation or use of soil or seed-applied insecticides at rates providing corn rootworm control the following year. These measures are intended

to educate growers of the potential for change in efficacy, reduce the possibility of grower loss from change in efficacy and reduce potentially resistant insects contributing to the following year's pest population.

2. Confirmed Resistance from Population Monitoring

Confirmed Resistance is defined as: (1) Unexpected Damage in OAM Xtra corn fields resulting from (2) a heritable, significant reduction in sensitivity Cry34/35Ab1 proteins for a corn rootworm population that (3) persists in the field, resulting in (4) increased survival of adults on OAM Xtra corn and (5) is field-relevant, resulting in economic root injury as defined in local extension recommendations.

3. Suspected Resistance – Investigation of Field Reports

Suspected Resistance is defined as: (1) an initial performance inquiry investigation resulting in a find of Unexpected Damage (a field having an overall average CRWNIS rating of 1.0 or greater for plants containing event DAS-59122-7 (1.5 or greater under exceedingly high corn rootworm pressure); (2) protein levels in green plant tissue of affected plants found to be within the documented range for that hybrid (if data are available); and (3) bioassays of insect collected from the affected fields showing statistically significantly lower sensitivity (e.g. elevation of the LC50 or EC50) compared with the historical baseline and laboratory susceptible populations for corn rootworm-active protein in OAM Xtra products.

The registrant will follow up on grower, extension specialist or consultant reports of unexpected product performance due to corn rootworm species listed on the label. The registrants will instruct its customers to contact them if such incidents occur. The registrants will investigate all such reports submitted to the company or the company's representatives.

- Confirm the corn in question is rootworm-active *Bt* corn;
- Confirm the field in question contains the correct blend rate of refuge corn;
- Confirm that species not susceptible to the protein are not responsible for the damage, that no climatic or cultural reasons could be responsible for the damage, and that all other reasonable causes based on historical experience for the observed root damage have been ruled out;
- If not due to other reasons, the registrant will conduct a thorough investigation of the factors known to affect the manifestation of corn rootworm feeding damage
- If the investigation fails to rule out target pest resistance as the cause, resistance is suspected.

If resistance is "suspected" as defined above, the insect population will be characterized further to conform whether or not the corn rootworm population is resistant. Pioneer will inform growers in the area of the potential benefit of crop rotation to a non-host crop (preferred approach). Alternatively, the use of additional corn rootworm control tools in combination with or in place of OAM Xtra products may be recommended. For example soil insecticides, seed-applied insecticides or chemigation in combination with OAM Xtra products are expected to reduce the corn rootworm larval population. Insecticides applied to corn rootworm adults during the period of adult emergence, but before

oviposition, can be used as a control measure. Use of an alternative corn rootworm-active plant-incorporated protectant may also be used to reduce the local surviving population.

4. Confirmed Resistance – Investigation of Field Reports

- Injury potential of the field-collected rootworm population feeding on plants containing DAS-59122-7 remains at a level likely to produce repeated product failure in field conditions;
- Subsequent populations collected from the area and assayed show that the results are repeatable;
- The change in injury potential has been documented as a heritable characteristic of the target pest population;
- Greenhouse node-injury evaluation confirms product failure; and
- Continued monitoring of the area suggests that the change is spreading.

5. Remedial Action

When resistance is "confirmed", the following steps will be taken:

- The EPA must receive notification from Pioneer within 30 days of confirmed resistance;
- Stakeholders in the Remedial Action Zone including customers, Extension specialists and crop consultants will be informed so that best management practices can be followed; and
- Management of resistant populations in the Remedial Action Zone will involve the integration of multiple pest management practices (i.e. IPM) such as crop rotation, pest population monitoring, soil-applied and seed applied insecticides, insecticides to control corn rootworm adults, and alternative corn rootworm-active traits.

4) Condition 8. a) Refuge Requirements for OAM Xtra is modified by changing the cotton growing in-field strip requirement to "When planting the refuge in strips across the field, refuges must be at least four (4) rows wide."

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA section 6(e). A stamped copy of the label is enclosed for your records.

Sincerely,

Kimberly Nesci, Acting Chief
Microbial Pesticides Branch
Biopesticides and Pollution
Prevention Division (7511P)

Enclosure

5/7

Optimum® AcreMax® Xtra Insect Protection

(OECD Unique Identifier: DAS-Ø15Ø7-1xDASx59122-7xMON-ØØ81Ø-6)

Active Ingredients:

Bacillus thuringiensis var. aizawai Cry1F protein and the genetic material (PHI8999) necessary for its production in corn event DAS-Ø15Ø7-1 ..... <0.0011%*

Bacillus thuringiensis Cry34Ab1 protein and the genetic material (PHP17662) necessary for its production in corn event DAS-59122-7) ..... <0.0054%

Bacillus thuringiensis Cry35Ab1 protein and the genetic material (PHP17662) necessary for its production in corn event DAS-59122-7 ..... <0.0042%*

Bacillus thuringiensis subsp. kurstaki Cry1Ab protein and the genetic material (PV-ZMBK07) necessary for its production in corn event MON-ØØ81Ø-6 ..... <0.0015%*

Inert Ingredient:

Phosphinothricin acetyltransferase (PAT) marker protein and the genetic material necessary for its production in corn ..... <0.0013%*

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* Percentage (wt/wt) on a dry wt. basis for whole plant tissue of 1507x59122xMON810 plants.

CAUTION

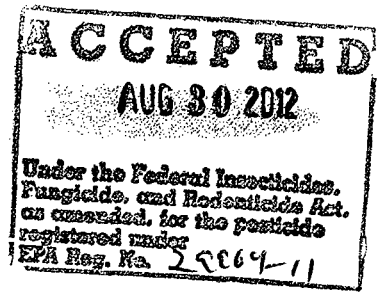
KEEP OUT OF REACH OF CHILDREN

NET CONTENTS _____

EPA REGISTRATION NUMBER: 29964-11

EPA ESTABLISHMENT NUMBER: 029964-IA-001

Pioneer Hi-Bred International, Inc.
7300 NW 62nd Avenue
Johnston, IA 50131



DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

The plant-incorporated protectant must be used as specified in the terms and conditions of the registration.

Optimum® AcreMax™ Xtra Insect Protection consists of 90% 1507x59122xMON810 maize and 10% non-Bt seed blended together in a bag of seed. This product controls above- and below-ground pests of maize, and the blended non-Bt plants provide refuge for both lepidopteran and corn rootworm pests.

INSECT RESISTANCE MANAGEMENT

Growers are instructed to read information on insect resistance management.

The following information regarding commercial production must be included in the grower guides for cotton and non-cotton growing areas:

Corn seed bags or bag tags for products containing Optimum® AcreMax™ Xtra must include the refuge size requirement in text and graphical format.

Corn-Belt/Non-Cotton Growing Areas

Optimum® AcreMax™ Xtra Insect Protection contains a Lepidopteran and corn rootworm refuge that is "in the bag" and is automatically implemented when the grower plants the product. No additional refuge is required when planting this product.

Foliar insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. Foliar insecticide treatments are also permitted for control of corn rootworm adults if economic thresholds are reached. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants).

Cotton-Growing Region Refuge Requirements

In cotton-growing regions where corn earworm is a significant pest:

- The 20% refuge must be planted with non-*Bt* corn hybrids.
- Optimum® AcreMax™ Xtra and the 20% non-*Bt* refuge should be sown on the same day, or with the shortest window possible between planting dates
- External refuges may be planted as an in-field or adjacent (e.g., across the road) refuge or as a separate block within 1/2 mile of the Optimum® AcreMax™ Xtra corn field.
- In field refuge options include: blocks, perimeter strips (i.e., along the edges or headlands), or in-field strips.
- When planting the refuge in strips across the field, refuges must be at least four (4) rows wide.
- Insecticide treatments for control of European corn borer, corn earworm, southwestern corn borer, fall armyworm, black cutworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer may be applied only if economic thresholds are reached for one or more of these target pests. In addition, the refuge can be protected from CRW damage by an appropriate seed treatment or soil insecticide; however, insecticides labeled for adult CRW control must be avoided in the refuge during the period of CRW adult emergence. Economic thresholds will be determined using methods recommended by local or regional

professionals (e.g., Extension Service agents, crop consultants). Microbial *Bt* insecticides must not be applied to non-*Bt* corn refuge plants.

- Cotton-growing areas include the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, Stoddard).

Use Pattern

Crop	Pests
Field corn	black cutworm corn earworm European corn borer fall armyworm lesser corn stalk borer southern corn stalk borer southwestern corn borer sugarcane borer stalk borer western bean cutworm western corn rootworm northern corn rootworm Mexican corn rootworm